

General Description

The ZM120P04D combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

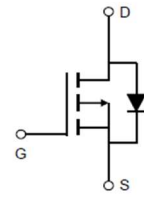
Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

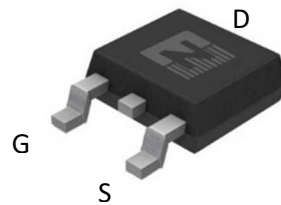
Product Summary



$$V_{DS} = -40V$$

$$R_{DS(ON)} = 12m\Omega$$

$$I_D = -45A$$



TO-252



Ordering Information:

Part NO.	ZM120P04D
Marking	ZM120P04
Packing Information	REEL TAPE
Basic ordering unit (pcs)	2500

Absolute Maximum Ratings ($T_C = 25^\circ C$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	$I_D @ T_C = 25^\circ C$	-45	A
	$I_D @ T_C = 75^\circ C$	-34	A
	$I_D @ T_C = 100^\circ C$	-28	A
Pulsed Drain Current ^①	I_{DM}	-135	A
Total Power Dissipation($T_C = 25^\circ C$)	$P_D @ T_C = 25^\circ C$	50	W
Total Power Dissipation($T_A = 25^\circ C$)	$P_D @ T_A = 25^\circ C$	1.25	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$

Single Pulse Avalanche Energy	E_{AS}	125	mJ
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•Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.4	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	65	° C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	° C

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = -250\mu A$	-40			V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = -250\mu A$	-1.2		-2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = -40V, V_{GS} = 0V$			1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = -10V, I_D = -3A$		12	15.6	m Ω
		$V_{GS} = -4.5V, I_D = -2A$		15	19.5	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = -10V, I_D = -2A$		18		s

•Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz$ $V_{DS} = -25V$	-	2750	-	pF
Output capacitance	C_{oss}		-	185	-	
Reverse transfer capacitance	C_{rss}		-	135	-	

•Gate Charge characteristics($T_a = 25^\circ C$)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	$V_{DD} = -25V$	-	30	-	nC
Gate - Source charge	Q_{gs}	$I_D = -5A$	-	9	-	
Gate - Drain charge	Q_{gd}	$V_{GS} = -10V$	-	15	-	

Note: ① Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;

Fig.1 Gate-Charge Characteristics

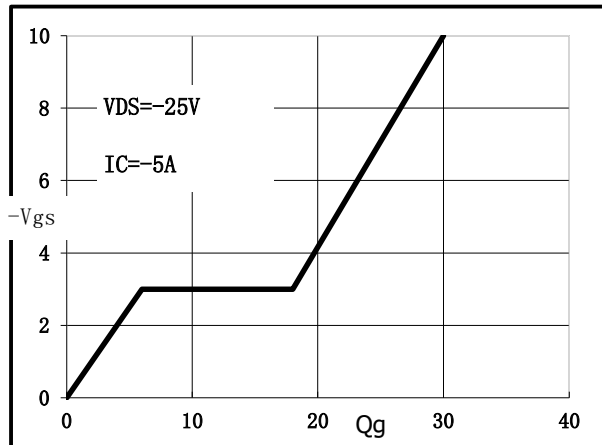


Fig.2 Capacitance Characteristics

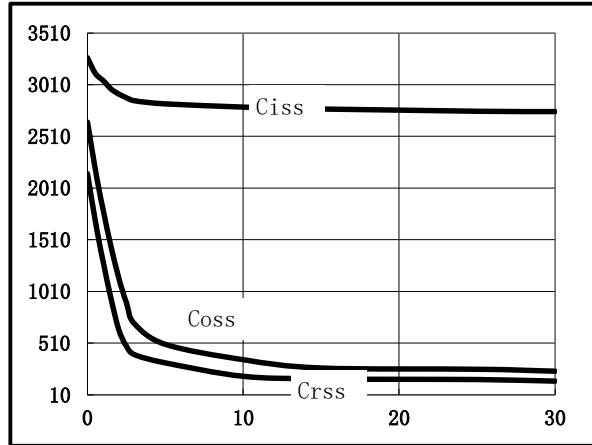


Fig.3 Power Dissipation Derating Curve

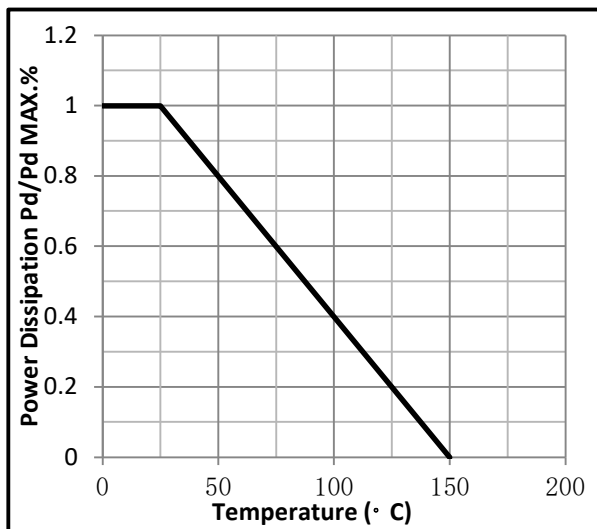


Fig.4 Typical output Characteristics

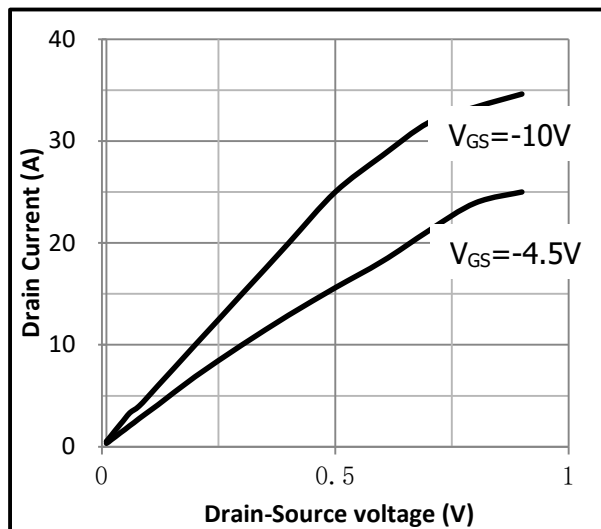


Fig.5 Threshold Voltage V.S Junction Temperature

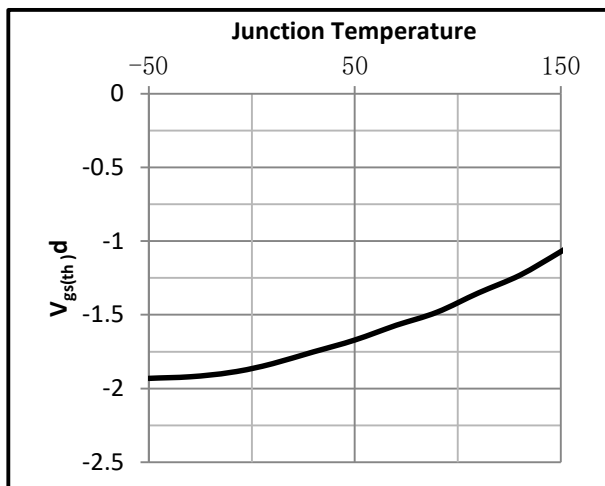


Fig.6 Resistance V.S Drain Current

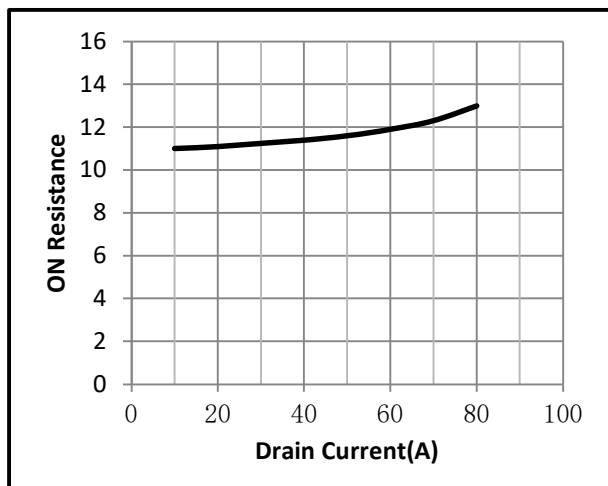


Fig.7 On-Resistance VS Gate Source Voltage

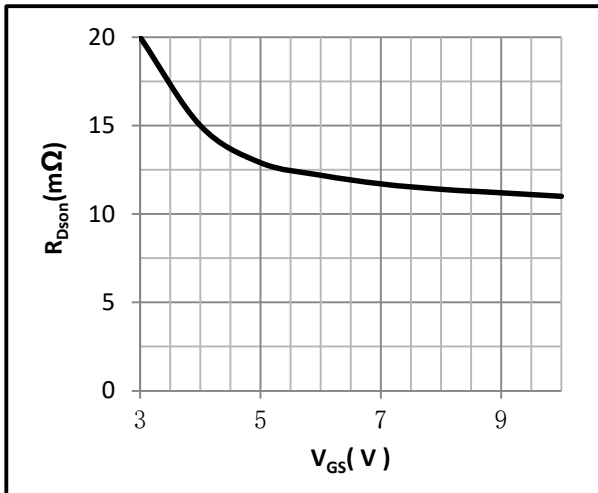


Fig.8 On-Resistance V.S Junction Temperature

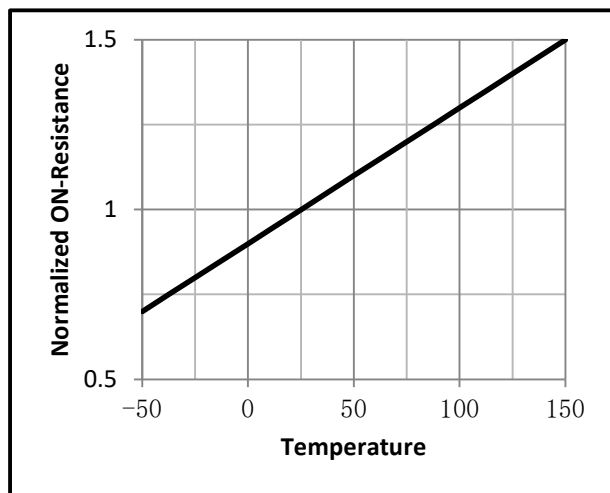


Fig.7 Gate Charge Measurement Circuit

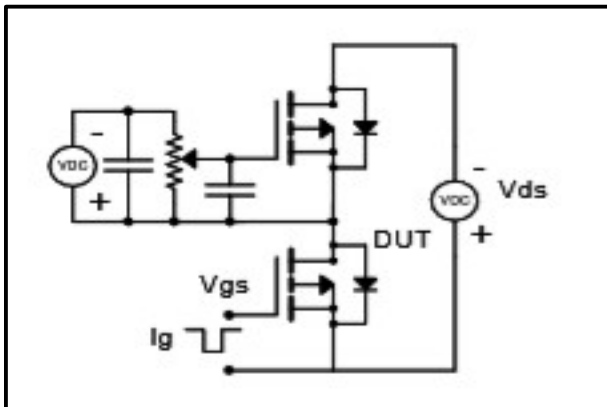


Fig.8 Gate Charge Waveform

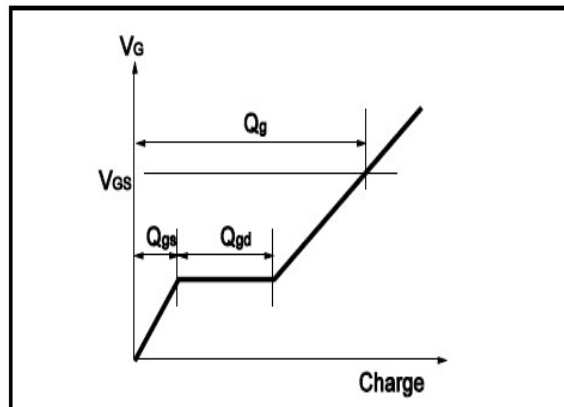


Fig.9 Switching Time Measurement Circuit

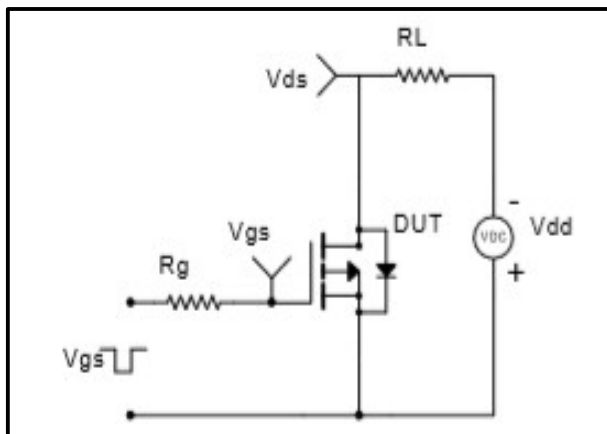


Fig.10 Switching Time Waveform

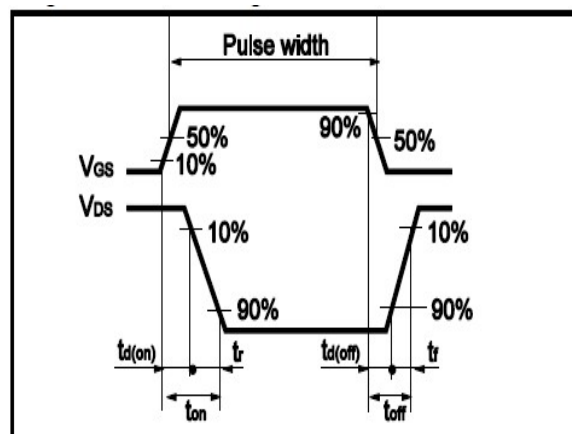


Fig.11 Avalanche Measurement Circuit

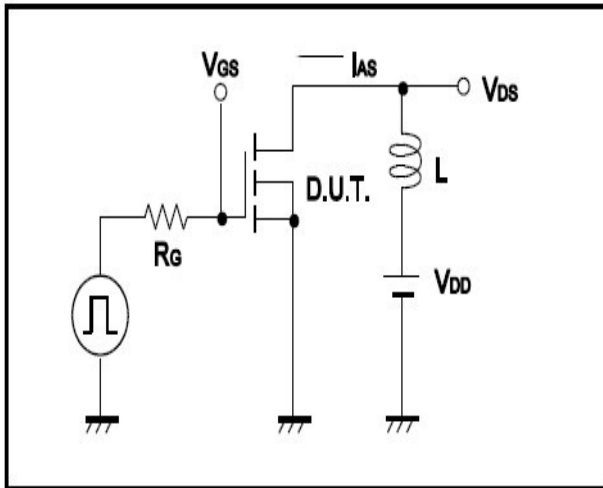
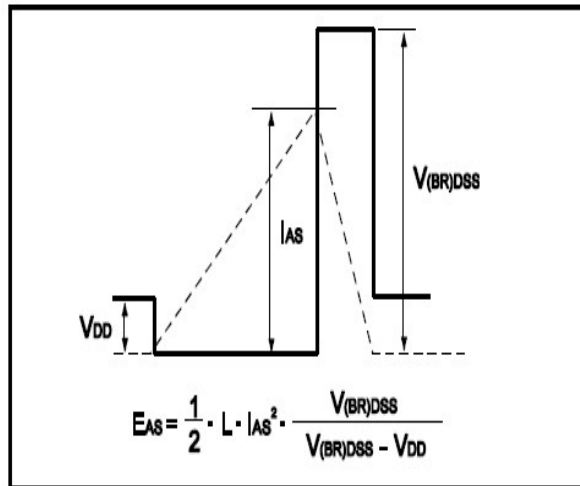


Fig.12 Avalanche Waveform



•Dimensions(TO-252)

Unit: mm

SYMBOL	min	max	SYMBOL	min	max
A	2.10	2.50	B	0.85	1.25
b	0.50	0.80	b1	0.50	0.90
b2	0.45	0.70	C	0.45	0.70
D	6.30	6.75	D1	5.10	5.50
E	5.30	6.30	e1	2.25	2.35
L1	9.20	10.60	e2	4.45	4.75
L2	0.90	1.75	L3	0.60	1.10
K	0.00	0.23			

